New Combinations in South American *Glandularia* (Verbenaceae)

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Abstract. Morphological and karyological features support the transfer of four species from *Verbena* L. to *Glandularia* J. F. Gmelin: *G. balansae* (Briquet) N. O'Leary, *G. paraguariensis* (Moldenke) N. O'Leary, *G. tecticaulis* (Troncoso) N. O'Leary, and *G. thymoides* (Chamisso) N. O'Leary. Nevertheless, this group has features, such as brief style length and the funnelform and short corolla tubes, that are typical of *Verbena*. These four species represent a group informally named Balansae that is interesting from an evolutionary point of view. Two lectotypifications are made for *G. balansae* and *G. thymoides*.

Resumen. Caracteres morfológicos y cariológicos sustentan la transferencia de cuatro especies de *Verbena* L. a *Glandularia* J. F. Gmelin: *G. balansae* (Briquet) N. O'Leary, *G. paraguariensis* (Moldenke) N. O'Leary, *G. tecticaulis* (Troncoso) N. O'Leary y *G. thymoides* (Chamisso) N. O'Leary. Sin embargo este grupo posee caracteres, como el estilo corto y los tubos corolinos breves, infundibuliformes, que son típicos de *Verbena*. Estas cuatro especies representan un grupo ambiguo, evolutivamente interesante, informalmente llamado Balansae. Se introducen dos lectotipificaciones para *G. balansae* y *G. thymoides*.

Key words: *Glandularia*, IUCN Red List, South America, *Verbena*, Verbenaceae.

The genus *Verbena* was described by Linnaeus (1753), and *Glandularia* was later described by J. F. Gmelin (1791 [1792]) with the species *G. carolinensis* J. F. Gmelin. Subsequent authors have included *Glandularia* species within *Verbena* (Schauer, 1847; Bentham & Hooker, 1876; Briquet, 1895; Perry, 1933). Schnack and Covas (1944) studied the chromosome numbers, and both genera were differentiated, the basic chromosome number being $x = 5$ for *Glandularia* and $x = 7$ for *Verbena*. There are also several morphological and anatomical features that differentiate the genera (Schnack & Covas, 1944, 1946; Schnack, 1964; Umber, 1979; Botta, 1989). Most *Glandularia* species have a cylindrical to quadrangular stem with cortical chlorophyllous parenchyma in a continuous band (Botta, 1989: 384, fig. 4A). Inflorescences of *Glandularia* are arranged as a monobotryum or pleiobotryum of one to three florescences, as frondose synflorescences. The mature calyx in *Glandularia* is usually longer than the fruit that it encloses, with five long, sharp-pointed teeth that are connivent and contorted at maturity. The corolla is hypocrateriform (Lindley, 1951: 19), with a long tube, exceeding 7 mm, colored red, violet, blue, lilac, or even yellow. In *Glandularia* the upper anther pair can have glandular appendages on the connective, and thecae always surpass the connective; the style is more than three times the length of the ovary (Fig. 1F–J, Table 1).

In contrast, *Verbena* has a quadrangular stem with cortical chlorophyllous parenchyma in a discontinuous band, interrupted at the corners by bundles of collenchyma and sclerenchyma (Botta, 1989: 384, fig. 4B). The inflorescences in *Verbena* form a pleiobotryum of many florescences, mostly bracteose, arranged in a paniculiform or corymbiform pattern. The mature calyx in *Verbena* is of the same length as the enclosed fruit, with five taper-pointed teeth that are connivent but not contorted at maturity. The corolla is funnelform (Lindley, 1951: 19), with a short tube, generally not exceeding 7 mm, colored pale blue, violet, lilac, or white. The anther connectives have no glandular appendages, and thecae generally do not surpass the connective; the style in *Verbena* is up to three times the length of the ovary (Fig. 1A–E; Table 1).

In the context of the taxonomic revision of *Verbena* (O'Leary et al., 2007; O'Leary et al., in prep.), a morphologically homogenous group of four species, intermediate between *Verbena* and *Glandularia*, herein referred to as the informal group Balansae, was studied, and these species were transferred from *Verbena* to *Glandularia*. These plants grow in northeastern Argentina, eastern Paraguay, Uruguay, and southern Brazil (Moldenke, 1962, 1964; Troncoso, 1968; Troncoso & Bacigalupo, 1982).

Materials and Methods

Voucher specimens and herbaria material analyzed of *Glandularia balansae* (Briquet) N. O'Leary, *G. paraguariensis* (Moldenke) N. O'Leary, *G. tecticaulis* (Troncoso) N. O'Leary, and *G. thymoides* (Chamisso) N. O'Leary were deposited at AS, BA, BAB, BAF, CTES, FCQ, PY, and SI. Given that these four taxa

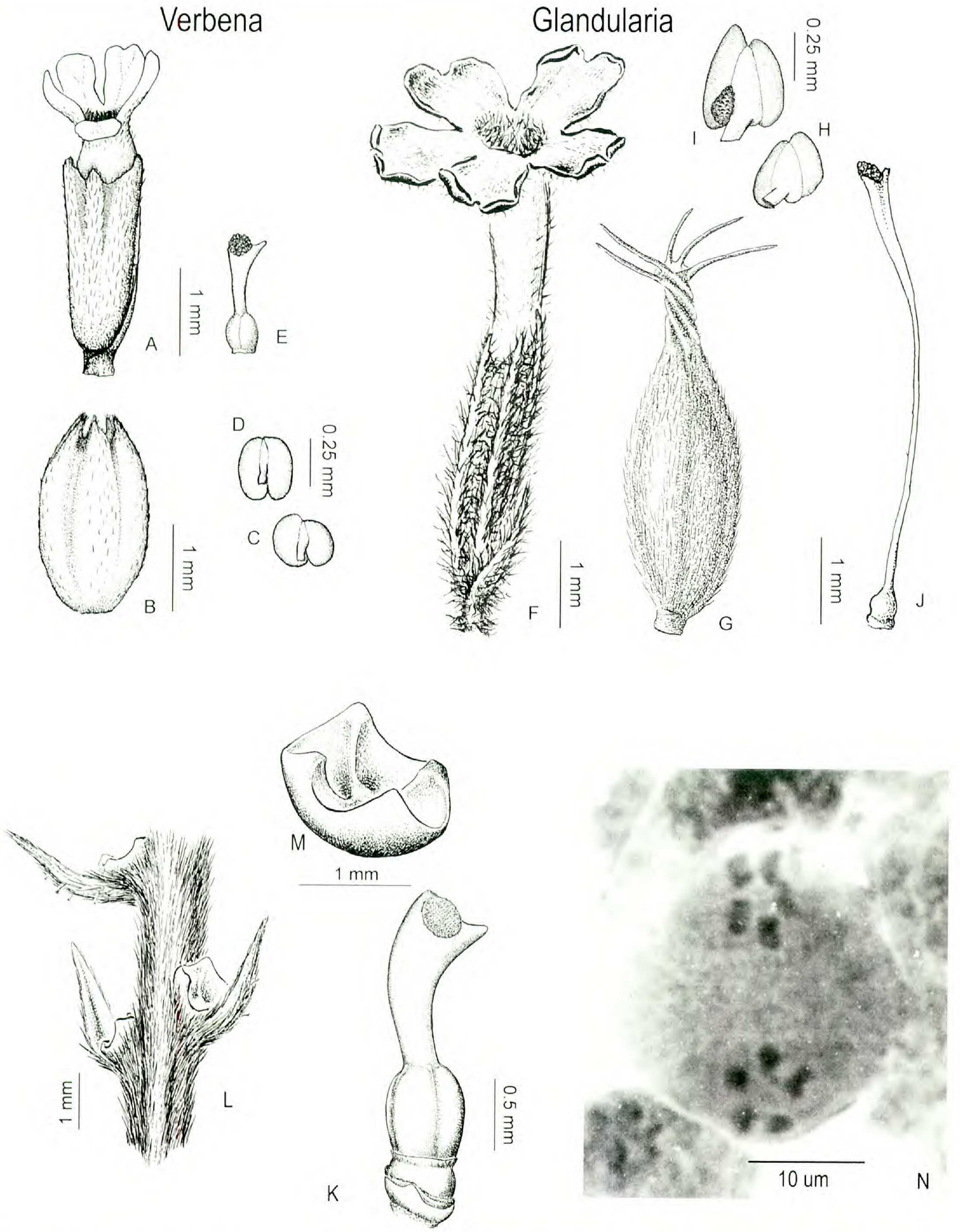

Figure 1. A–E. Typical *Verbena* features. —A. Flower. —B. Calyx enclosing fruit. —C. Lower anther, dorsal view. —D. Upper anther, dorsal view. —E. Gynoecium. (A, drawn from *V. litoralis* Kunth from Troncoso, 1979: 242 by Francisco Rojas; B–E, drawn from *V. montevidensis* Sprengel from Troncoso, 1979: 240 by Francisco Rojas.) F–J. Typical *Glandularia* features. —F. Flower. —G. Calyx enclosing fruit. —H. Lower anther, dorsal view. —I. Upper anther with glandular appendage, dorsal view. —J. Gynoecium. (F, *G. spectabilis* (Moldenke) Botta, from *Cabrera 25575* (SI); G, I, J, drawn from *G. megapotamica* (Sprengler) Cabrera & Dawson, Troncoso, 1979: 255 by Francisco Rojas; H, drawn from *G. cabrerae* (Moldenke) Botta, from Botta & Troncoso, 1993: 108 by Francisco Rojas.) K–M. Floral receptacle in *G. tecticaulis* (Troncoso) N. O'Leary. —K. Young gynoecium, showing undeveloped floral receptacle. —L. Part of a mature florescence, floral bracts and floral receptacles visible. —M. Detail of a developed floral receptacle, showing the four concavities where each nutlet was located. (K–M, from *Schinini & Caballero Marmori 27181*, SI.) —N. *Glandularia thymoides* (Chamisso) N. O'Leary. Microphotograph of meiotic chromosomes in metaphase II, polar view (*R. Guaglianone et al. 3278*, SI).

Table 1. Diagnostic morphological, anatomical, and karyological characters that distinguish *Verbena* from *Glandularia*; also compared to those characters present in group Balansae here analyzed.

	Verbena	Informal group Balansae	*Glandularia*
Stem cross section	quadrangular	cylindrical	cylindrical to quadrangular
Cortical chlorophyllous parenchyma	discontinuous	continuous	continuous
Florescence pattern	pleiobotryum of many florescences, mostly as bracteose synflorescences	monobotryum or pleiobotryum of 1 to 3 florescences, as frondose synflorescences	monobotryum or pleiobotryum of 1 to 3 florescences, as frondose synflorescences
Mature calyx	same length as the fruit, with 5 brief taper-pointed teeth, not contorted	usually longer than the fruit, with 5 long sharp-pointed teeth, contorted	usually longer than the fruit, with 5 long sharp-pointed teeth, contorted
Corolla tubes	funnelform; short; pale blue, violet, lilac, or white	funnelform; short; pale blue, violet, lilac, or yellow	hypocrateriform; long; red, violet, blue, lilac, or yellow
Upper anther pair	without glandular appendages	often with traces of glandular appendages	with or without glandular appendages
Stamens thecae	generally not surpassing the connective	always surpassing the connective	always surpassing the connective
Style	not more than 3× longer than the ovary	not more than 3× longer than the ovary	more than 3× longer than the ovary
Floral receptacle	undeveloped	developed	generally developed
Basic chromosome number	$x = 7$	$x = 5$	$x = 5$

have been poorly collected and that two of them are endemic to Paraguay, chromosomal studies were difficult to carry out, as no fresh samples could be obtained during fieldwork. Just one species, *G. thymoides*, could be karyologically studied. Meiotic material of identical plants from a population of *G. thymoides* from Entre Ríos (*R. Guaglianone et al. 3278*, SI) was collected, and young flower buds were fixed in 3 parts of absolute alcohol: 1 part of glacial acetic acid. The anthers were squashed in a drop of acetic hematoxilin 2% (Núñez, 1968).

Results

The species of the informal group Balansae share a subshrubby habit, strigose pubescence in stems and leaves with scattered glandular hairs, and the floral bracts shorter than the calyx. When mature the calyx disperses with the fruit, leaving a structure behind on the rachis subtended by the floral bract. This structure may be the floral receptacle, which enlarges after anthesis, thickening into a fleshy, yellowish to ochre-colored structure (Fig. 1K–M). The presence of this thick receptacle is a common feature in several *Glandularia* species, as for example, in *G. hunzeana* (Moldenke) Troncoso and *G. incisa* (Hooker) Troncoso, but has not been seen in any *Verbena* species.

The four species herein transferred to *Glandularia* share many morphological and anatomical features with *Glandularia* (Table 1), i.e., the florescences arranged in a monobotryum or pleiobotryum of one to three florescences, as a frondose synflorescence; the mature calyx exceeding the fruit length, with five long, sharp-pointed teeth that are contorted at maturity; the upper anther pair often with vestigial glandular appendages, the thecae surpassing the connective; and the stems cylindrical, with cortical chlorophyllous parenchyma in a continuous band. Nevertheless, two features are typical of *Verbena*: the short style measuring less than three times the length of the ovary and the funnelform, short corolla tubes, less than 7 mm. These two features were traditionally used by several authors (Schnack & Covas, 1944; Botta, 1989, 1993; Botta & Troncoso, 1993) to discriminate between both genera, but now seem to be unreliable. Because *Glandularia* is characterized by having a basic chromosome number $x = 5$, and *Verbena* $x = 7$ (Schnack & Covas, 1944; Lewis & Oliver, 1961), chromosomal studies were attempted. Just one species, *G. thymoides*, could be karyologically studied, and the results revealed a haploid number $n = 5$ (Fig. 1N) typical of *Glandularia*. These data further suggest that the group Balansae is better placed in *Glandularia*, so these four species are here transferred to *Glandularia*. These four species

represent an interesting group for phylogenetic study toward the evolution of both genera.

Taxonomy of *Glandularia* Group Balansae

1. Glandularia balansae (Briquet) N. O'Leary, comb. nov. Basionym: *Verbena balansae* Briquet, Annuaire Conserv. Jard. Bot. Genève 7–8: 293. 1904. TYPE: Paraguay. Campos Caaguazú, Mar. 1876, *B. Balansa 1028* (lectotype, designated here, G; isotypes, G photo F 24680, K, P, SI). Figure 2.

Subshrubs, to 50 cm, stems and branches erect, decumbent at the base, cylindrical, strigose with scattered glandular hairs, short internodes, less than 1 cm. *Leaves* trisected, linear segments (0.5–)1–2 × 0.02–0.1 cm, or narrowly elliptical, 0.5 cm wide, lateral segments usually bipartite or bisected; sessile, apex acuminate, margins entire, usually revolute, with scattered short hairs, strigose pubescence on both surfaces, venation palmate. *Inflorescences* terminal, to 2–3 cm, ca. 1 cm wide, cylindric-ovoid during anthesis, oblong in fruit, arranged in monobotryum or pleiobotryum of 1 to 3 florescences, as a frondose synflorescence, the principal florescence subsessile, surpassed by the lateral ones. *Flowers* sessile, floral bracts narrowly ovate, (0.2–)0.3–0.4(–0.65) cm, sparsely strigose, glabrous margins; calyx (0.4–)0.5–0.6(–0.8) cm with 5 sharp-pointed teeth, 1 mm, connivent and contorted in fruit, sparsely strigose; corolla funnelform, tube (0.52–)0.65–0.7(–0.82) cm, pale blue or lilac turning white to violet, with moniliform hairs on corolla throat; the upper anther pair with vestigial glandular appendages or none; style 1.5–2 mm. Nutlets 2–2.5 mm, the outer surface reticulate apically to striate basally, the commisural nutlet face verrucose.

Distribution, ecology, and IUCN Red List category. *Glandularia balansae* occurs in northeastern Argentina in the provinces of Misiones and Corrientes, in Brazil in the states of Paraná and Mato Grosso do Sul, and in Paraguay. It inhabits dry fields, in grasslands, but has also been found in flooded areas. According to the current knowledge of the species and using the IUCN Red List categories (IUCN, 2001), *G. balansae* can tentatively be classified as LC (Least Concern).

Notes. *Glandularia balansae* is morphologically similar to *G. thymoides* (see comments under this species).

Typification. Briquet (1904) cited the two syntypes: *Balansa 1163* and *Balansa 1028*. The specimen *Balansa 1163* (Paraguay, Utangú, Villa Rica, Dec. 1874) could not be located, so *Balansa 1028* has been chosen as the lectotype. The material from G was chosen as lectotype because it is in a good state of conservation and it is the herbarium where the author was known to work (Stafleu & Cowan, 1976).

Selected specimens examined. ARGENTINA. **Corrientes:** Dpto. Ituzaingó, ruta 12, *A. Krapovickas 16028* (CTES, SI), ruta 12, ca. A. Itaembé, *M. C. Romanczuk et al. 357* (SI); Dpto. Sto. Tomé, Gob. Virasoro, *A. Cabrera 28420* (SI), Gob. Virasoro, *A. Krapovickas 17113* (CTES, SI), Gob. Virasoro, *A. Schinini & Carnevali 10474* (CTES, SI); Entre Sto. Tomé y Virasoro, *F. Zuloaga et al. 5365* (SI); Ea. Garruchos el duraznillo, *R. Guaglianone et al. 230* (SI); Ao. Chimiray, *A. Krapovickas 26144* (CTES, SI), *C. Cristobal & A. Krapovickas 1751* (CTES, SI). **Misiones:** Dpto. Apóstoles, Esc. Agrotécnica, Co. Ceferino, *A. Cabrera 28700* (SI), *A. Cabrera 29424* (SI), *F. Zuloaga et al. 923* (SI); Dpto. Candelaria, Bonpland, *P. Jörgensen 226* (BAB), Loreto, *M. Múlgura et al. 2237* (SI); Dpto. Capital, Posadas, *R. Martínez Crovetto 8100* (SI). BRAZIL. **Mato Grosso do Sul:** Ponta Porá, *G. Hatschbach 58759* (CTES, SI). **Paraná:** Fazenda Monte Alegre, *G. Hatschbach 2765* (SI); Ponta Grossa, prox. Vila Velha, *L. T. Dombrowski 6327* (SI); Rio Capivara, Mun. Palmeira, *G. Hatschbach 15345* (SI); Mun. Piraí do Sul, Alta da Serra das Furnas, *G. Hatschbach et al. 69903* (CTES). PARAGUAY, s. loc. *P. Jörgensen 4582* (SI), *R. Hauthal 26* (SI), *A. Burkart 18961* (SI). **Amambay:** Ea. San Luis, *A. Schinini et al. 35986* (CTES, PY). **Caaguazú:** Ea. Primera, *T. Rojas 5069* (SI). **Caazapá:** San Juan Nepomuceno, *T. Rojas 5788A* (SI); Dist. Yuty, ca. San Miguel, *M. M. Arbo et al. 2874* (CTES). **Cordillera:** Itacurubi, Ea. Rolón, *T. Rojas 7537* (SI). **Guairá:** Villa Rica, 10 Dec. 1894, s. coll. (BA 23536). **San Pedro:** Ea. Sta. Ana, *I. Basualdo 4855* (FCQ).

2. Glandularia paraguariensis (Moldenke) N. O'Leary, comb. nov. Basionym: *Verbena paraguariensis* Moldenke, Phytologia 1: 483. 1941. TYPE: Paraguay, Sa. de Amambay, Dec. 1907, *E. Hassler 9751* (holotype, G 6700000326; isotypes, BM not seen, G 6700000325, MO, NY). Figure 3.

Subshrubs, to 70 cm, stems and branches erect, cylindrical, strigose with scattered glandular pubescence, short internodes, less than 2 cm. *Leaf* blades entire, narrowly elliptic to linear, ca. 2 × 0.2–0.3 cm, appressed to the stem; sessile, apex acuminate, margins entire, with scattered hairs, strigose pubescence on both surfaces, venation pinnatifid. *Inflorescences* terminal, filiform, to 40 cm, flowers remote, alternately arranged, rachis slender, flexuous, arranged in monobotryum or pleiobotryum of 1 to 3 florescences, as a frondose synflorescence, the principal florescence subsessile, surpassed by the lateral ones. *Flowers* sessile, floral bracts narrowly ovate, 0.2–0.3 cm, sparsely strigose, margins glabrous; calyx ca. 0.6 cm with 5 sharp-pointed teeth, connivent and contorted in fruit, sparsely to densely strigose; corolla funnelform, tube (0.52–)0.65–0.7(–0.82) cm, pale blue, lilac turning white, with moniliform hairs on corolla throat;

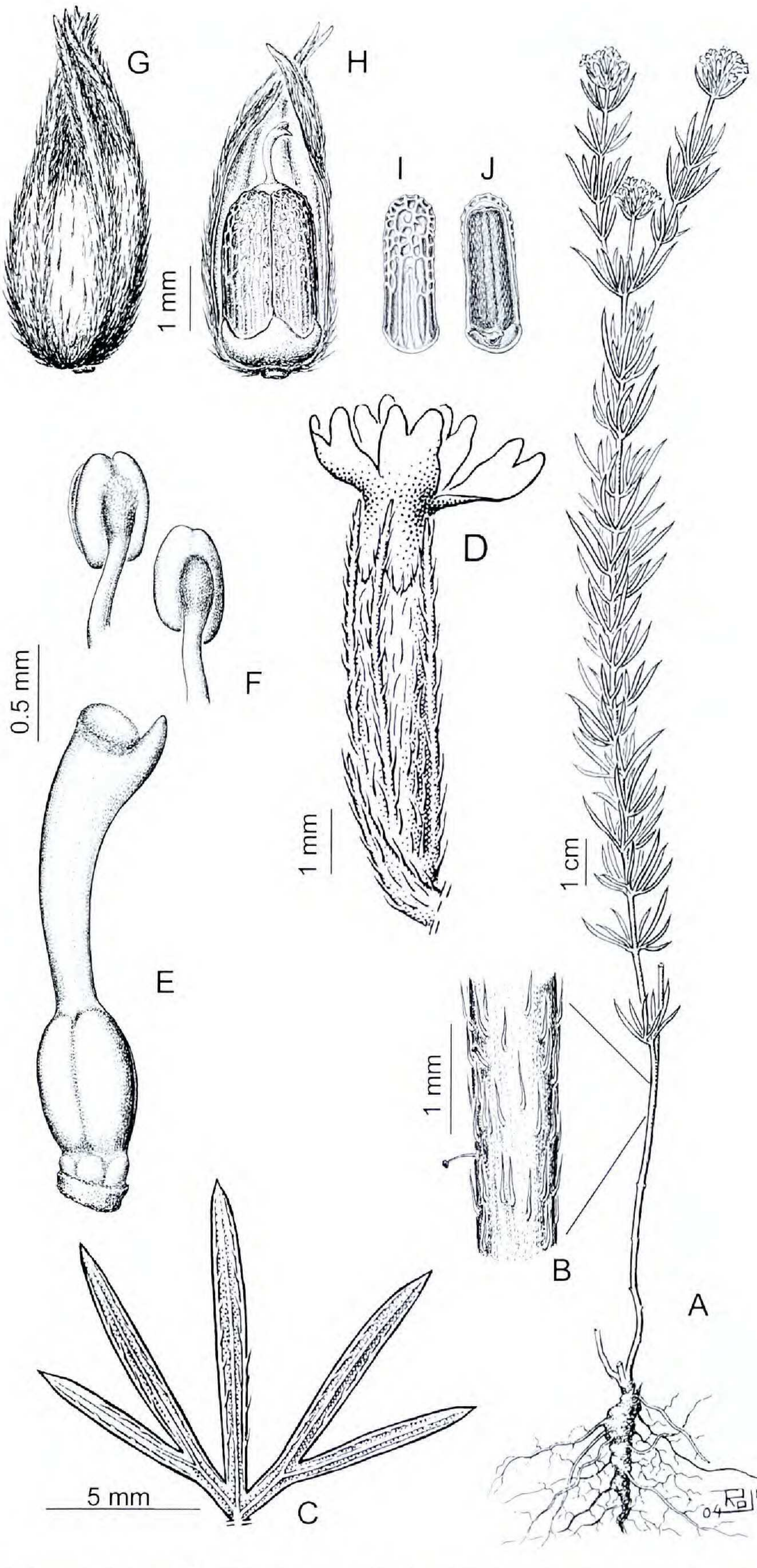

Figure 2. *Glandularia balansae* (Briquet) N. O'Leary. —A. Habit. —B. Detail of stem pubescence. —C. Abaxial face of leaf. —D. Flower. —E. Gynoecium. —F. Upper pair of anthers. —G. Calyx enclosing fruit. —H. Same as G but part of the calyx removed, showing the fruit. —I. Nutlet, dorsal view. —J. Nutlet, ventral view. (A, C–F, from *Rojas 7537*; B, G–J, from *Schinini & Carnevali 10474*).

the upper anther pair with vestigial glandular appendages; style 1.5–2 mm. Nutlets 2.5–3 mm, the outer surface reticulate apically to striate basally, the commisural nutlet face verrucose.

Distribution, ecology, and IUCN Red List category. *Glandularia paraguariensis* is endemic to Paraguay in the Sierras of Amambay. This species is quite undercollected and is known so far only from the specimens

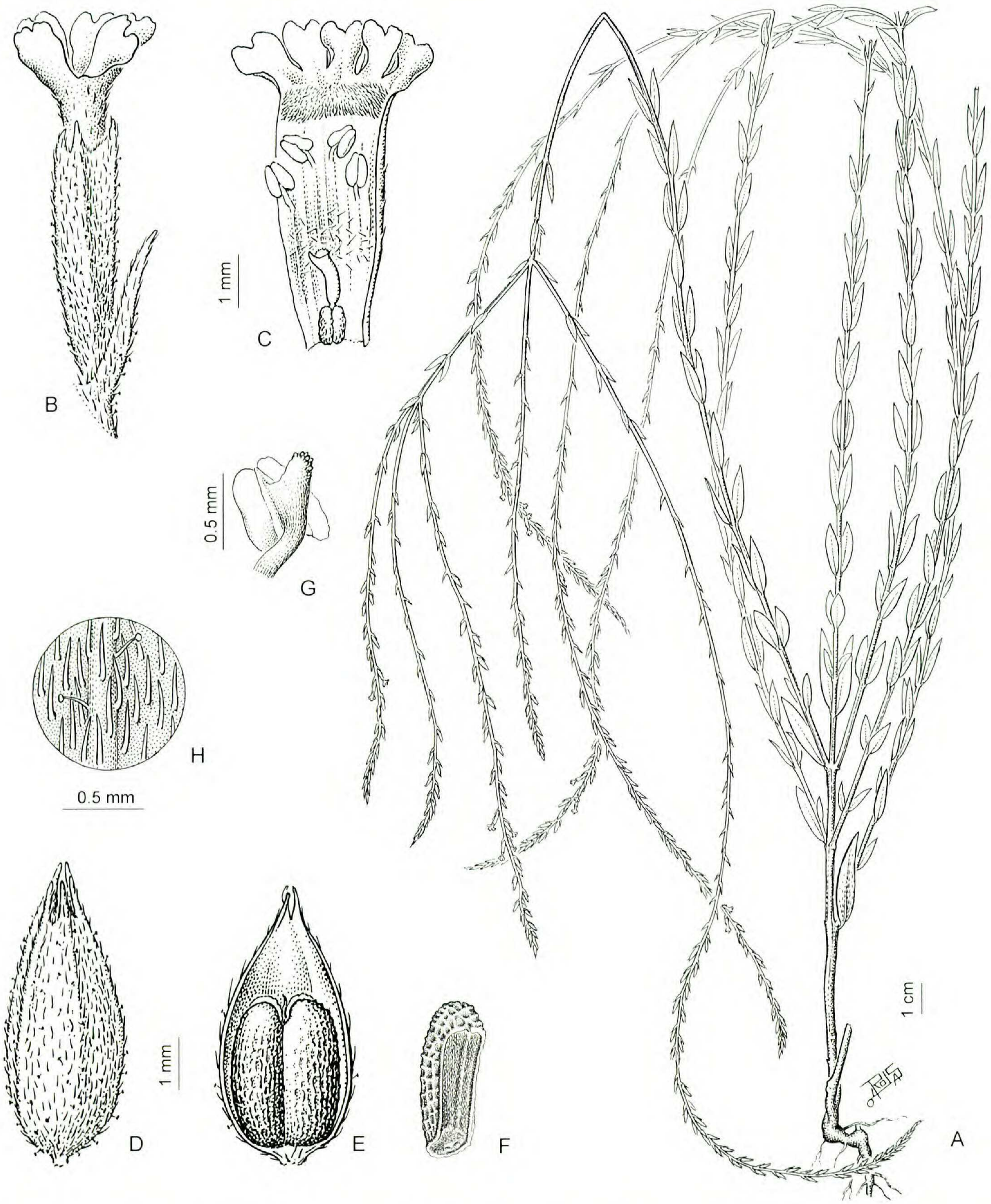

Figure 3. *Glandularia paraguariensis* (Moldenke) N. O'Leary. —A. Habit. —B. Flower. —C. Open corolla showing position of anthers and gynoecium. —D. Calyx enclosing fruit. —E. Same as D but part of the calyx removed, showing the fruit. —F. Nutlet. —G. Upper anther with glandular appendage. —H. Detail of abaxial leaf pubescence (from *Rojas 6586*, SI).

cited herein. Based on this evidence, following the IUCN Red List categories (IUCN, 2001), we evaluate the provisional conservation status of this species as DD (Data Deficient). We hope that this publication will contribute to a better knowledge of this species, and that future surveys could reveal further information.

Notes. *Glandularia paraguariensis* can be easily distinguished from the other three species of group Balansae by its long, filiform florescences, which are shorter and denser in *G. balansae*, *G. thymoides*, and *G. tecticaulis*. Moreover, *G. paraguariensis* has the leaf blades entire, being partitioned in the other three species.

Briquet (in sched.) named the specimen *Hassler 9751* (G) as *Verbena balansae* var. *integrifolia*, but never published this name. Later, Moldenke (1941) chose this specimen as type for his species *V. paraguariensis*.

Selected specimen examined. PARAGUAY. **Amambay:** Pedro Juan Caballero, Jan. 1934, *T. Rojas 6586* (SI).

3. Glandularia tecticaulis (Troncoso) N. O'Leary, comb. nov. Basionym: *Verbena tecticaulis* Troncoso, Darwiniana 14: 633. 1968. TYPE: Paraguay. "Curso superior del Paraná," 1909–1910, *K. Fiebrig 5837bis* (holotype, SI).

Subshrubs, to 50 cm, stems and branches erect, cylindrical, strigose with scattered glandular pubescence, short internodes 1–2 cm. *Leaves* appressed to the stem, ca. 1.5 × 0.8 cm, ovate, rounded base, trilobate to tripartite apex, with each lobe triangular, acuminate, margins entire, revolute, with strigose pubescence on both surfaces, venation palmate, subparallel and converging toward base. *Inflorescences* terminal, cylindric-ovoid during anthesis, turning oblong in fruit, each florescence brief and wide, elongating to 2 cm, arranged in monobotryum or pleiobotryum of 1 to 3 florescences, as a frondose synflorescence, the principal florescence subsessile, surpassed by lateral ones. *Flowers* sessile, floral bracts narrowly ovate, ca. 0.4 cm, sparsely strigose, margins glabrous; calyx ca. 0.6 cm, with 5 sharp-pointed teeth, connivent and contorted in fruit, sparsely to densely strigose, sometimes glandular hairs; corolla funnelform, tube 0.6 cm, pale blue, lilac to yellow, with moniliform hairs on corolla throat; the upper anther pair with vestigial glandular appendages or none; style 1.5–2 mm. Nutlets 2–2.5 mm, the outer surface reticulate apically to striate basally, the commisural nutlet face verrucose.

Iconography. N. S. Troncoso, 1968: 634, fig. 2.

Distribution, ecology, and IUCN Red List category. *Glandularia tecticaulis* is endemic to Paraguay, Alto Paraná department. It grows in dry fields surrounded by small shrubs, in cerrado regions. This species appears to be a very localized endemic, with small populations known, and consequently poorly collected. A preliminary status of VU (Vulnerable) can be assigned to the species, following IUCN Red List categories (IUCN, 2001).

Notes. This species is easily distinguished due to the trilobate or tripartite leaves, appressed to the stem, while in *Glandularia balansae* and *G. thymoides* leaves are trisected and never appressed to the stem. The specimen label for *Degen 247* (CTES, FCQ) indicates yellow flowers. Troncoso (1968), in the protologue of this species, states that this taxon represents an interesting case in the delimitation of *Verbena* and *Glandularia*, because it has features of both genera.

Selected specimens examined. PARAGUAY. **Alto Paraná:** Ea. Sta. Elena, río Pirá Pytá, 16 Oct. 1990, *G. Caballero Marmori s.n.*, Hb. Itaipú 1802 (CTES); Hernandarias, *A. Schinini 8061* (CTES); Ea. Sta. Elena, río Pirá Pytá, *A. Schinini & G. Caballero Marmori 27181* (CTES, G, SI); reserva Tatí Yupí, *G. Caballero Marmori 538* (CTES), *R. Degen 247* (CTES, FCQ), *A. Schinini & G. Caballero Marmori 26921* (CTES, G).

4. Glandularia thymoides (Chamisso) N. O'Leary, comb. nov. Basionym: *Verbena thymoides* Chamisso, Linnaea 7: 257. 1832. TYPE: [Brazil.] Brasilia, *Sellow s.n.* (lectotype, designated here, K; isotypes, BR, G, K, M, NY, SI).

Verbena thymoides f. *albiflora* Moldenke, Phytologia 3(4): 178. 1949. Syn. nov. TYPE: Uruguay. Dpto. Minas [Lavalleja]: Cerro Nico Perez y Sa. Tapambay, Nov.–Dec. 1892, *J. Arechavaleta 11/1982* (holotype, MVM not seen; isotype, NY).

Subshrubs, to 20–30 cm, stems and branches decumbent to procumbent at the base, cylindrical, strigose pubescence, short internodes, less than 1 cm. *Leaves* trisected, linear segments or narrowly elliptical, to 1 cm, lateral segments usually bipartite or bisected; sessile, apex acuminate, margins entire, usually revolute with scattered short hairs, strigose pubescence on both surfaces, venation palmate. *Inflorescences* terminal, to 2–3 cm, ca. 1 cm wide, cylindric-ovoid during anthesis, oblong in fruit, arranged in monobotryum or pleiobotryum of 1 to 3 florescences, as a frondose synflorescence, the principal florescence subsessile, surpassed by lateral ones. *Flowers* sessile, floral bracts narrowly ovate, (0.18–)0.2–0.22(–0.28) cm, sparsely strigose, glabrous margins; calyx (0.3–)0.4(–0.45) cm with 5 sharp-pointed teeth, connivent and contorted in fruit, sparsely strigose; corolla funnelform, tube (0.4–)0.5–0.55(–0.65) cm, pale blue, lilac turning white, to violet, with moniliform hairs on corolla throat; the upper anther pair with vestigial glandular appendages; style 2–2.5 mm. Nutlets ca. 2 mm, the outer surface reticulate apically to striate basally, the commisural nutlet face verrucose.

Chromosome number. $n = 5$ ($x = 5$). Figure 1N.

Iconography. N. S. Troncoso & N. Bacigalupo, 1982: 486, fig. 4.

Distribution, ecology, and IUCN Red List category. *Glandularia thymoides* occurs in Argentina in the province of Entre Ríos, in southern Brazil in the states of Río Grande do Sul, Santa Catarina, and

Paraná, and in Uruguay. It is found in dry fields, somewhat rocky or sandy soils, generally among grasses. According to the current knowledge of the species and using the IUCN Red List categories (IUCN, 2001), *G. thymoides* can tentatively be classified as LC (Least Concern).

Notes. *Glandularia thymoides* is morphologically very similar to *G. balansae* in its leaf blades being trisected, with segments linear or narrowly elliptical, and cylindric-ovoid florescences. Troncoso and Bacigalupo (1982) distinguish both species by the length of the leaves, the presence or absence of vestigial glandular appendages on the anthers, and the comparative length of the floral bracts, calyx, and style, as explained in the key. *Glandularia balansae* has a different habit, being more erect, while *G. thymoides* is prostrate. Finally, *G. balansae* grows in Paraguay and northeastern Argentina, in Misiones and Corrientes provinces, while *G. thymoides* is found to the south and east, reaching Uruguay and the Argentine province of Entre Ríos. Both taxa coexist in southern Brazil (Moldenke, 1962; Troncoso & Bacigalupo, 1982). This distribution could indicate that *G. balansae* is associated with the Paraná river course, while *G. thymoides* is associated with the Uruguay river course.

The name *Verbena thymoides* was used later by J. Ball (1890) to describe a taxon from Chile that is now recognized as a species of *Junellia* Moldenke, so Ball's name is illegitimate (Art. 52.1; Greuter et al., 2000).

Moldenke considered that the color of the flowers constituted an important character that should have taxonomic relevance. However, given that these species show quite variable flower colors, his form *albiflora* should not be recognized as an infraspecific taxon within *Verbena thymoides* [= *Glandularia thymoides*].

Typification. The photograph from the Field Museum number 17454 of the destroyed holotype from the Berlin herbarium had a label that read: "*Verbena thymoides n.* Bras. merid., *Sellow*" and another label with the number "1482," even though the protologue of this species indicated no number for the Sellow collection. In K there are two specimens that could be isotypes of the destroyed Berlin holotype, since both bear a label: "*Verbena thymoides n.*" typical of Chamisso's new taxa. The specimen chosen as the lectotype has a stamp that reads "15 nov. 1907"; this date is an obvious later addition to the specimen, and the specimen is chosen because it includes more material of better quality. The isotypes at BR and NY are "ex B," as indicated by their labels; the specimens from M and G are also original and representative isotypes, but the one from K was selected because it is a more complete specimen.

Selected specimens examined. ARGENTINA. **Entre Ríos:** Dpto. Concordia, Calabacilla, ca. Nueva Escocia, *R. Guaglianone et al. 3278* (SI), camino a Calabacilla, Pto. Yeruá, *N. Troncoso 2822* (SI). BRAZIL. **Paraná:** Palmeira, corrego da anta, 2 Feb. 1975, *T. Pedersen s.n.* (CTES 354603); Lapa, *L. T. Dombrowski 6756* (SI); Sta. Barbara, mun. Palmas, *G. Hatschbach 15013* (SI); Rio Passa 2, mun. Lapa, *G. Hatschbach 22310* (SI). **Rio Grande do Sul:** Torres, Butiazal, *K. Hagelund 15027* (CTES); Fachinal Preto, Bom Jesus, *R. Reitz 3312* (SI); Serra do Merval ca. Pinheiro Machado, *G. Pabst 6515* (SI); Cacapava do sul, *K. Hagelund 11731* (CTES, SI); Arroio dos Ratos, Faxinal, *T. Pedersen 12619* (CTES, SI); Serinha Dom Pedrito, *M. Sobral 1543* (SI). **Sta. Catarina:** Sombrío, *B. Rambo 32003* (SI), *R. Reitz c1062* (SI); Curralinhos, Araranguá, *R. Reitz c883* (SI). URUGUAY. **Co. Largo:** Sa. Aceguá, *B. Rosengurtt 1001* (SI). **Maldonado:** Blno. Solis, *A. Burkart 12680* (SI); Sa. Ánimas, Solís, *C. Osten 11638* (BAF). **Rivera:** Zapucay, *A. Flossdorf 98* (BAF). **Tacuarembó:** Valle Edén, *W. Herter 3920* (SI), *C. Osten 6594* (SI).

KEY TO THE *GLANDULARIA* SPECIES GROUP BALANSAE

1a. Blades entire; florescences long, to 40 cm in fruit, filiform; flowers remote . . . . . *G. paraguariensis*
1b. Blades trilobate, tripartite, or trisected; florescences short, to 2–3 cm in fruit, not filiform; flowers congested 2
2a. Leaves appressed to the stem, this scarcely visible; blades trilobate to tripartite at the apex . . . . . *G. tecticaulis*
2b. Leaves not appressed to the stem, this easily visible; blades trisected, segments linear to narrowly elliptical, lateral segments usually bipartite or bisected 3
3a. Erect plants; leaves (0.5–)1–2 cm long; usually no glandular appendages on upper anther pair; style 1.5–2 mm long; floral bracts (0.2–)0.3–0.4(–0.65) cm long; calyx (0.4–)0.5–0.6(–0.8) cm long; corolla tube (0.52–)0.65–0.7(–0.82) cm long . . . . . *G. balansae*
3b. Prostrate plants; leaves to 1 cm long; presence of vestigial glandular appendages on upper anther pair; style 2–2.5 mm long; floral bracts (0.18–)0.2–0.22(–0.28) cm long; calyx (0.3–)0.4(–0.45) cm long; corolla tube (0.4–)0.5–0.55(–0.65) cm long . . . . . *G. thymoides*

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